

THE INVENTION CLAIMED IS

Claim 1. An apparatus for improving vision utilizing a patient's retina, comprising:

a light source for producing a beam of light,

a corrector,

a wavefront sensor,

a testing unit,

optic means for directing said beam of light to said corrector, to said retina, from said retina to said wavefront sensor, and to said testing unit, and

a computer operatively connected to said wavefront sensor and said corrector.

Claim 2. The apparatus for improving vision of claim 1 wherein said corrector comprises a microelectromechanical system corrector.

Claim 3. The apparatus for improving vision of claim 1 wherein said corrector comprises a deformable mirror.

Claim 4. The apparatus for improving vision of claim 1 wherein said corrector comprises a liquid crystal spatial light modulator.

Claim 5. The apparatus for improving vision of claim 1 wherein said corrector comprises a microelectromechanical system deformable mirror.

Claim 6. The apparatus for improving vision of claim 1 wherein said testing unit includes an eye chart.

Claim 7. The apparatus for improving vision of claim 1 wherein said testing unit includes a video projector.

Claim 8. The apparatus for improving vision of claim 1 wherein said testing unit includes a video monitor.

Claim 9. The apparatus for improving vision of claim 1 wherein said optic means includes an adjustable lens.

Claim 10. The apparatus for improving vision of claim 9 wherein said adjustable lens is a phoropter.

Claim 11. The apparatus for improving vision of claim 1 wherein said optic means includes a flip-in mirror operatively connected to said testing unit.

Claim 12. The apparatus for improving vision of claim 1 wherein said optic means includes a beam splitter operatively connected to said testing unit.

Claim 13. The apparatus for improving vision of claim 1 wherein said optic means includes a beam splitter operatively connected to said light source.

Claim 14. The apparatus for improving vision of claim 1 including a target.

Claim 15. The apparatus for improving vision of claim 14 wherein said target is a focusing target.

Claim 16. The apparatus for improving vision of claim 1 including a diverter means for diverting said beam of light to said testing unit.

Claim 17. The apparatus for improving vision of claim 16 wherein said diverter means is a flip-in mirror.

Claim 18. The apparatus for improving vision of claim 16 wherein said diverter means is a beam splitter.

Claim 19. The apparatus for improving vision of claim 1 wherein said wavefront sensor comprises a Hartmann-Shack type wavefront sensor.

Claim 20. A method of improving vision utilizing a patient's retina, comprising the steps of:

producing a beam of light utilizing a light source,

directing said beam of light to a corrector,

directing said beam of light from said corrector to said retina and
producing a return beam of light,

directing said return beam of light to said corrector, to a wavefront sensor,
and to a testing unit.

Claim 21. The method of improving vision of claim 20 including the step
of having said patient focus on a target.

Claim 22. The method of improving vision of claim 20 wherein said
wavefront sensor produces information and including the step of capturing said
information produced by said wavefront sensor.

Claim 23. The method of improving vision of claim 22 including the step
of using said information produced by said wavefront sensor to improve said
patient's vision.

Claim 24. The method of improving vision of claim 23 wherein said step
of using said information produced by said wavefront sensor to improve said
patient's vision comprises producing custom contact lenses.

Claim 25. The method of improving vision of claim 23 wherein said step
of using said information produced by said wavefront sensor to improve said
patient's vision comprises custom ophthalmologic surgery.

Claim 26. The method of improving vision of claim 23 wherein said step
of using said information produced by said wavefront sensor to improve said
patient's vision comprises custom intra-ocular implants.